

REMARKS

Claims 1-12 are currently pending in the application, of which claims 1, 2, and 7 are independent. Claims 1-12 stand rejected. Applicants amend claims 1-4, 7, 9, and 12 herein to address the Examiner's clarity concerns. No new matter is added, and no new issues are raised. Applicants respectfully traverse the outstanding rejections.

I. **Claim Rejections under 35 U.S.C. §112**

A. **Enablement**

The Examiner rejects claim 1 under 35 U.S.C. §112, first paragraph, because the specification allegedly does not provide enablement for the first jutting-out portion and the second jutting-out portion being joined together over the entire peripheries thereof. Specifically, the Examiner points to Figure 7 and alleges that the components are joined together by a cured adhesive layer [17] as an intervening layer between the major surfaces of the jutting out portions and not only along the edges. Applicants respectfully disagree.

Figure 7 shows the adhesive layer coating the peripheral edges of the elements 15 and 16. It appears that the Examiner may have misinterpreted the extent of the adhesive layer 17 shown in cross-sectional view in Figure 7. The Examiner may have conflated layer 17 and layer 12 (the second electrode layer), which is shown in the center of the unit 7 between the peripheries covered by adhesive layer 17. Layer 17 extends only on the periphery of the jutting out portions, and there is a gap between the adhesive 17 and the electrode 12.

The test for enablement is whether the disclosure, when filed, contained sufficient information regarding the subject matter of the claims as to enable one skilled in the pertinent art to make and use the claimed invention without undue experimentation. The Specification clearly describes that "these first and second jutting-out portions 15 and 16 are joined together over the entire peripheries thereof via an endless cured adhesive layer 17, and the entire periphery of the second jutting-out portion 16 is in a state in which it is impregnated by cured adhesive" at page 7. The meaning of "periphery" is made clear with reference to Figure 7, which shows the extent of the cured adhesive layer (which joins the jutting out portions over their peripheries and impregnates the "entire periphery" of the second jutting out portion).

Accordingly, Applicants respectfully submit that the present disclosure is enabling for the recited claim language.

Claims 5 and 6 are rejected under 35 U.S.C. §112, first paragraph, for depending from rejected base claim 1. In light of the above, Applicants respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. §112, first paragraph rejection of claims 1, 5, and 6.

B. Antecedent Basis

Claims 1-6, 9, and 12 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully traverse the rejection.

Claims 1 and 2 recite “the periphery,” which the Examiner objects to as not having antecedent basis in the claims. Applicants amend claims 1 and 2 to recite “a periphery.”

Claims 1 and 2 further recite “the entire peripheries,” which the Examiner objects to as not having antecedent basis in the claims. Applicants amend claims 1 and 2 to recite “the first and second jutting-out portions (15, 16) each having a periphery and being joined together over the entirety of their peripheries.”

The Examiner objects to claims 1, 2, 4, and 12 as being unclear as to how a singular periphery can be joined to plural peripheries. It appears that the Examiner may have misinterpreted the use of the words “periphery” and “peripheries.” Specifically, the claims use the word “periphery” and “peripheries” in several different contexts. For example, claim 1 has *a first jutting-out portion (15) that juts out from peripheries of the first diffusion layer (13)*, but also recites *the first and second jutting-out portions (15, 16) each having a periphery and being joined together over the entirety of their peripheries*. The periphery of the first diffusion layer is different from the peripheries of the first and second jutting-out portions. The claim clearly recites that the first and second jutting out portions are joined over their peripheries (i.e., the two elements each have a periphery and those peripheries are joined), and hence a singular periphery is not joined to a plurality of peripheries, as the Examiner seems to interpret at page 4 of the Office Action.

The Examiner rejects claims 1 and 3 for failing to provide sufficient antecedent basis for the term “the cured adhesive layer.” Applicants respectfully submit that antecedent basis for this term can be found at line 18 in claim 1 (with reference to the claim listing provided above) and at line 18 in claim 2, from which claim 3 depends.

The Examiner rejects claim 3 as failing to provide sufficient antecedent basis for the term “the outer edge.” Applicants amend claim 3 to recite “an outer edge.” Applicants note that claim 1 is not rejected for this issue, but claim 1 also recites “the outer edge.” Appropriate correction has accordingly been made to claim 1.

Further, the Examiner asserts “it is unclear from the scope of the claim how the outer edge of the electrode layer is mutually exclusive from a previously recited periphery thereof.” As shown, for example, in Figure 7, the staggered outer edges of the electrode layers refer to the outer limits of the electrode layers. In contrast, the periphery includes the area at the periphery of the electrode layers, for example the area indicated as joined by the adhesive layer 17.

The Examiner rejects claim 7 for reciting “in the electrode structure (7), a portion of the second jutting-out portion.” Applicants remove this phrase for the sake of clarity.

The Examiner rejects claim 12 for failing to provide sufficient antecedent basis for the phrases “the first separator” and “the second separator.” Applicants amend claim 12 to recite “a first separator” and “a second separator.”

Further, the Examiner states, at page 4, second-to-last paragraph, “it is unclear from the scope of the claim how.” The sentence then cuts off without being completed. If the Examiner has any concerns regarding the clarity of the claim, the Examiner is invited to contact the Applicants attorney using the contact information at the end of this response in order to clarify any concerns the Examiner may have.

Claims 3-6 stand rejected under 35 U.S.C. §112 as being dependent upon a rejected base claim. In light of the above, Applicants respectfully request that the outstanding 35 U.S.C. §112 rejections be reconsidered and withdrawn.

II. Claim Rejections under 35 U.S.C. §102

Claims 2 and 5-10 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,264,299 to Krasij (hereafter “Krasij”). Applicants respectfully traverse the rejections.

The present application is generally directed to an electrode structure for a fuel cell. Specifically, the present application notes that, in conventional electrode structures, the outer edge of the first electrode layer and first diffusion layer (supplying, for example, fuel gas) and the outer edge of the second electrode layer and second diffusion layer (supplying, for example, an oxidizing gas) are present in close proximity. Accordingly, when fuel gas and oxidizing gas leak from the edges of the first electrode layer and the second electrode layer, the gases undesirably react with each other around the electrode structure. To combat this undesirable reaction, the present application describes a staggered structure including “jutting out portions.”

A first jutting out portion extends from the solid polymer electrolyte membrane beyond the peripheries of the first diffusion layer and the first and second electrode layers. A second jutting out portion extends from the second diffusion layer beyond the periphery of the second electrode layer. The second jutting out portion faces the first jutting out portion, and the two jutting out portions are joined over their entire peripheries via a cured adhesive layer.

The Examiner asserts that Krasij includes the jutting out portions of the present invention, pointing to Figure 2 of Krasij for support (Office Action at page 6). The Examiner does not specifically identify what he believes the jutting out portions of Krasij to be, but the Examiner does specify that the second jutting out portion is “impregnated by cured adhesive [24’].” Thus, it appears that the Examiner is interpreting the heavy cross-hatched areas labeled 24’ in Figure 2 of Krasij as the jutting out portions of the present invention.

However, Figure 2 of Krasij does not show the structure recited in claims 2 and 5-10 for several reasons. For example, claim 2 describes the jutting out portions in this way:

the solid polymer electrolyte membrane (10) is formed so as to have a first jutting-out portion (15) that juts out from peripheries of the first diffusion layer (13) and the first and second electrode layers (11, 12), the second diffusion layer (14) is formed so as to have a second jutting-out portion (16) that juts out from a

periphery of the second electrode layer (12) and faces the first jutting-out portion (15), the first and second jutting-out portions (15, 16) each having a periphery and being joined together over the entirety of their peripheries via a cured adhesive layer (17)

In Figure 2 of Krasij, the membrane 21' does appear to jut out from the periphery of the first diffusion layer (which the Examiner interprets as either element 22 or 23 and are shown in Figure 2 as 22' and 23', respectively) and first and second electrode layers (located on the PEM-facing side of 22', 23'). However, the second diffusion layer (either 22' or 23') does not include *a second jutting-out portion (16) that juts out from a periphery of the second electrode layer (12) and faces the first jutting-out portion*, as required by claim 2.

Krasij does not show the electrode layers explicitly. Instead, Krasij notes that the electrode layers may be provided either on the surfaces of the support plates 22 and 23 that face the PEM, or directly on the major surfaces of the PEM (Krasij at col. 5, lines 1-6). Under either of these alternatives, no “jutting-out portion” on the “diffusion layers” 22' and 23' extends beyond an electrode layer. If the electrode layer is provided on the PEM, it clearly extends beyond all the diffusion layers 22', 23' (since the PEM juts out beyond the diffusion layers 22', 23'). If the electrode layer is provided on the support plates 22' or 23', then clearly no part of the second diffusion layer 22', 23' could possibly extend beyond the electrode layer provided along the same plate.

Further, claim 2 recites that the first and second jutting out portions *each have a periphery and are joined together over the entirety of their peripheries via a cured adhesive layer (17)*. The first jutting-out portion of Krasij is not joined to anything over its periphery. The “cured adhesive layer” the Examiner points to in Krasij is a “body of elastomeric material” for making “the edge regions of the support plates 22 and 23 fluid impermeable and solid, thus in effect converting them into solid and impermeable frame portions” (Krasij at col. 5, lines 35-40). Element 24' of Krasij is not a cured adhesive layer, nor does it join the peripheries of a first and second jutting out portion.

Still further, claim 2 recites that *part of the surface of the first jutting-out portion (15) is set as an inlet area (a₃) and an outlet area (a₄) for said one type of gas (H)*. It does not appear that the Examiner addresses this limitation of claim 2 in the Office Action, but nothing in Krasij appears to correspond to the inlet area and the outlet area of claim 2. A corresponding inlet and

outlet area are also recited for the second jutting-out portion, which is also not disclosed in Krasij.

In light of the above, Krasij does not disclose each and every element of claim 2. Claims 5 and 6 depend from claim 2, and therefore include each and every feature of claim 2. Independent claim 7 recites similar features to claim 2, including:

the solid polymer electrolyte membrane (10) having a first jutting-out portion (15) that juts out from the peripheries of the first diffusion layer (13) and the first electrode layer (11); and

the second diffusion layer (14) having a second jutting-out portion (16) that juts out from the periphery of the second electrode layer (12) and faces the first jutting-out portion (15), at least one portion of the second jutting-out portion (16) being in a state in which it is impregnated by cured adhesive

Krasij does not disclose these features of claim 7 for the same reasons as discussed above with respect to claim 2. Claims 8-10 depend from claim 7, and therefore include each and every element of claim 7.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. §102(b) rejection of claims 2 and 5-10.

III. Claim Rejections under 35 U.S.C. §103

Claims 1, 3, 4, 11 and 12 stand rejected under 35 U.S.C. §103(a) as being obvious over Krasij in view of U.S. Patent No. 6,261,711 to Matlock. Applicants respectfully traverse the rejections.

As discussed above, Krasij does not disclose or suggest many of the elements of the claims, such as: [1] *a second jutting-out portion (16) that juts out from the periphery of the second electrode layer (12) and faces the first jutting-out portion (15);* [2] *the first and second jutting-out portions (15, 16) are joined together over the entire peripheries thereof via a cured adhesive layer (17);* and [3] *part of the surface of the first jutting-out portion (15) is set as an inlet area (a₃) and an outlet area (a₄) for said one type of gas (H).* The addition of Matlock fails to cure the factual deficiencies of Krasij with respect to these features.

Matlock is entirely silent with respect to these elements of the claims, and the Examiner

does not suggest that these elements appear in Matlock. Instead, the Examiner relies on Matlock for staggered electrode layers.

Accordingly, Krasij and Matlock, alone or in any reasonable combination, do not disclose or suggest each and every element of independent claims 1, 2, and 7. Claims 3 and 4 depend from claim 2, and claims 11 and 12 depend from claim 7. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. §103(a) rejections of claims 1, 3, 4, 11, and 12.

CONCLUSION

In light of the above, Applicants respectfully submit that the pending claims are in condition for allowance. If the Examiner deems that issues persist, the Examiner is encouraged to contact Applicants' attorney at the phone number below.

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